

WHAT IS CLAIMED IS:

1. A metallic filter for filtering a fluid, the filter comprising:  
a filter element for filtering the fluid, wherein a structure of the filter element has been strengthened by a heat treatment after assembly to resist  $\Delta P$  changes in the fluid to minimize irreversible compression and degradation of the filter element due to partial collapse of the filter element from a rise in the  $\Delta P$  of the fluid passing through the filter element.
2. A metallic filter according to claim 1, wherein the filter element includes a non-woven, metallic mat.
3. A metallic filter according to claim 2, wherein the filter element further includes at least two metallic support screens, and wherein the non-woven metallic mat is sandwiched between the at least two metallic support screens.
4. A metallic filter according to claim 3, wherein the filter element is formed from a material selected from the group consisting essentially of stainless steel titanium, nickel, Carpenter 20 Cb-3, Hastelloy R and Hastelloy X.
5. A metallic filter according to claim 3, wherein the non-woven metallic mat includes a plurality of metallic fibers, wherein the heat treatment after assembly bonds the fibers in the non-woven metallic mat to each other, and wherein the heat treatment after assembly bonds the at least two metallic support screens to the non-woven metallic mat.

6. A metallic filter according to claim 5, wherein the filter element is pleated and formed to surround a support member, and wherein the heat treatment after assembly occurs after pleating and forming.

5 7. A metallic filter according to claim 5, wherein the filter element withstands at least 500 psi with less than 19% irreversible compression and degradation.

8. A metallic filter according to claim 5, wherein the filter element withstands at least 500 psi with less than 15% irreversible compression and degradation.

9. A metallic filter according to claim 5, wherein the filter element withstands at least 500 psi with less than 5% irreversible compression and degradation.

10. A metallic filter according to claim 5, wherein the filter element withstands at least 1000 psi with less than 19% irreversible compression and degradation.

11. A metallic filter according to claim 2, wherein the non-woven metallic mat includes a plurality of metallic fibers, and wherein the heat treatment after assembly causes the fibers in the non-woven metallic mat to bond to each other.

12. A metallic filter according to claim 11, wherein the filter element withstands at least 500 psi with less than 19% irreversible compression and degradation.

13. A metallic filter according to claim 11, wherein the filter element withstands at least 500 psi with less than 15% irreversible compression and degradation.

14. A metallic filter according to claim 11, wherein the filter element withstands at least 500 psi with less than 5% irreversible compression and degradation.

15. A metallic filter according to claim 11, wherein the filter element withstands at least 1000 psi with less than 19% irreversible compression and degradation.

16. A metallic filter according to claim 2, wherein the non-woven metallic mat include metallic fibers, and wherein the non-woven metallic mat is heat treated before assembly to provide a first bonding of the metallic fibers.

17. A method of manufacturing a metallic filter for filtering a fluid, the method comprising the steps of:

providing a filter element;

heat treating a structure of the filter element after assembly to strengthen the filter element to resist  $\Delta P$  changes in the fluid to minimize irreversible compression and degradation of the filter element due to partial collapse of the filter element from a rise in the  $\Delta P$  of the fluid passing through the filter element.

18. A method according to claim 17, further comprising the step of forming the filter element from a non-woven, metallic mat.

19. A method according to claim 18, further comprising the steps of:

providing at least two metallic support screens; and

sandwiching the non-woven metallic mat between the at least two metallic support screens.

20. A method according to claim 19, further comprising the step of forming the filter element from a material selected from the group consisting essentially of stainless steel titanium, nickel, Carpenter 20 Cb-3, Hastelloy R and Hastelloy X.

5 21. A method according to claim 19, wherein the non-woven metallic mat includes a plurality of metallic fibers, wherein the step of heat treating after assembly bonds the fibers in the non-woven metallic mat to each other, and wherein the step of heat treating after assembly bonds the at least two metallic support screens to the non-woven metallic mat.

10 22. A method according to claim 21, further comprising the steps of:  
pleating the filter element; and  
forming the filter element to surround a support member before the heat treating after assembly step.

15 23. A method according to claim 21, further comprising the step of forming the filter element to withstand at least 500 psi with less 19% irreversible compression and degradation.

20 24. A method according to claim 21, further comprising the step of forming the filter element to withstand at least 500 psi with less than 15% irreversible compression degradation.

25 25. A method according to claim 21, further comprising the step of forming the filter element to withstand at least 500 psi with less than 5% irreversible compression and degradation.

26. A method according to claim 21, further comprising the step of forming the filter element to withstand at least 1000 psi with less than 19% irreversible compression and degradation.

27. A method according to claim 18, wherein the non-woven metallic mat includes a plurality of metallic fibers, and wherein the step of heat treating after assembly causes the fibers in the non-woven metallic mat to bond to each other.

5 28. A method according to claim 27, further comprising the step of forming the filter element to withstand at least 500 psi with less than 19% irreversible compression and degradation.

29. A method according to claim 27, further comprising the step of forming the filter element to withstand at least 500 psi with less than 15% irreversible compression and degradation.

10 30. A method according to claim 27, further comprising the step of forming the filter element to withstand at least 500 psi with less than 5% irreversible compression and degradation.

15 31. A method according to claim 27, further comprising the step of forming the filter element to withstand at least 1000 psi with less than 19% irreversible compression and degradation.

20 32. A method according to claim 18, wherein the non-woven metallic mat include metallic fibers, and further comprising the step of heat treating the non-woven metallic mat before assembly to provide a first bonding of the metallic fibers.